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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/003,114	12/06/2001	Masaki Yamada	216932US2	5215

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EXAMINER

GREENE, PERSHELLE L

ART UNIT PAPER NUMBER

2826

DATE MAILED: 05/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/003,114

Applicant(s)

YAMADA ET AL.

Examiner

Pershelle Greene

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 February 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 11-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7, 8 and 10 is/are rejected.
- 7) ☒ Claim(s) 6 and 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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Serial Number: 10/003114

Attorney's Docket #: 216932US2

Filing Date: 12/06/2001

Applicant: Yamada et al.

Examiner: Pershelle Greene

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5 and 7-8 are being rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art figure 1B, in view of Nakao et al. (U.S. Patent 6,498,094).

As to claim 1, Applicant's admitted prior art figure 1b shows all the claimed subject matter:

- A. "a first interlayer insulating layer" is met by the first interlayer insulating layer 230;
- B. "a trench formed in the first interlayer insulating layer" is met by the trench 208B formed in the first interlayer insulating film;

- C. "a conductive layer ... of the first interlayer insulating film" is met by the conductive layer 250 buried in the trench; the conductive layer has a surface thereof higher than a surface of the first interlayer insulating layer.
- D. "an insulating film ... and the conductive layer" is met by the insulating film 260 having a flat surface and covering the first interlayer insulating layer and the conductive layer; and
- E. "a second interlayer insulating layer ... to the insulating film" is met by the second interlayer insulating layer 270 formed on the insulating film, the second interlayer insulating layer having a high etching selective ratio to the insulating film.

The applicant's admitted prior art fails to show the conductive layer having a surface higher than highest surface of the first insulating layer surrounding and adjoining the trench.

Nakao et al. is cited for showing a method for providing a contact hole formed in an insulating film. Specifically, Nakao et al. shows, referring to figure 8(c), a conductive layer 41 having a surface thereof higher than a highest surface of the first insulating layer. It would have been obvious to one of ordinary skill art to use the conducting layer of Nakao et al. with the device of the applicant's admitted prior art for the purpose of helping to resist oxidation.

As to claim 2, a film thickness of the insulating film on the first interlayer-insulating layer is greater than that on the conductive layer. Referring to figure 1B, the insulating film does not cover a portion of the conductive layer; therefor the insulating film on the interlayer-insulating layer is greater than that on the conductive layer.

As to claim 3, the insulating film is made of a coating type material.

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As to claim 4, the insulating film has an effect of preventing diffusion of a conductor material in the conductive layer.

As to claim 5, any one of the first interlayer insulating layer and the second interlayer-insulating layer is made of an insulating material having a relative dielectric constant lower than that of a SiO₂ film.

As to claim 7, the conductive layer 250 includes a barrier metal layer 240.

As to claim 8, the conductive layer includes a Cu wiring layer.

Claim Objections

1. Claims 6 and 9 are being objected to as being dependent upon a rejected base claim.

Conclusion

2. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pershelle Greene whose telephone number is 571-272-1917. The examiner can normally be reached on M-F 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PLG
May 14, 2004


NATHAN J. FLYNN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800